Preliminary Determination
Bayer CropScience LP
503-0137

Introduction

On July 24, 2013, the Department received an air permit application from AMEC on behalf of Bayer CropScience LP. The application requested that Bayer be allowed to construct and operate a herbicide manufacturing plant for the production of Glufosinate-Ammonium (GA). Ammonium Chloride would also be produced as a by-product. The facility would include process equipment utilized for the production of the intermediates associated with the production of GA including all control equipment and storage tanks. The facility would also include product storage, truck and rail loading and unloading, product packaging, and product shipping. The facility would be considered a Greenfield Site. The GA facility would be located in the Theodore Industrial Park adjacent to the east side of the Evonik-Degussa facility and to the west of INEOS Phenol.

GA would be produced at the facility by utilizing a series of reaction steps to produce intermediates that would be converted into GA. The raw material Acrolein O-Acetate (ACA) would be produced by Evonik and transferred by pipeline to the facility. Forty-two VOC storage tanks would also be constructed as part of the production facility. The storage tanks would store raw materials, intermediate products, wastewater, and final products. Two emergency diesel generators would also be constructed as part of the proposed project. Additional information concerning this project was received on October 23, 2013, November 8, 2013, November 25, 2013, and December 4, 2013.

Control Equipment

Ten control devices and a leak detection and repair program (LDAR) would be used to minimize the emissions from the GA production process. The ten control devices would reduce the emissions from different parts of the process. The LDAR program would reduce emissions from equipment in volatile organic compound (VOC) service by monitoring for leaks.

The eight control systems that would be used by Bayer would be a central thermal oxidizer (CTO) and HCl scrubber in series (S01), a process flare (S02), a back-up thermal oxidizer and HCl scrubber in series (S03), a bleach scrubber (S04), a HCl storage tank scrubber (S05), an Ammonium Chloride drying scrubber (S06), an Ammonium Chloride Baghouse (S07), and a GA storage and loading scrubber (S08). Two emergency diesel generators (S09 & S010) would also be utilized by Bayer. The utilization of each control system and the generators is described below.

The CTO (S01) would be used to reduce emissions of VOCs/HAPs by a minimum of 98%. The thermal oxidizer would be constructed with Selective Non-Catalytic Reduction (SNCR) to reduce NOx emissions from the oxidizer. The process would also include a Heat Recovery Steam Generator (HRSG) to provide steam for the process. The associated scrubber (S01) would be utilized to control acid gas (HCl) produced in the thermal oxidizer to less than 20 ppm. The vents from several intermediate control devices including the central off-gas scrubber, HCl scrubber, phosphine scrubber, ACM Scrubber #1, and an ammonia scrubber would all be routed to S01 for control.

The process flare (S02) would be utilized to combust natural gas (primarily CH4) during start-up of the facility. Natural gas is a raw material for the production of one of the intermediates at the facility. Since it would only be utilized during start-up, the emissions would be trivial (less than 1 TPY for all pollutants) with the exception of Greenhouse Gases (GHGs) which would be less than 100 TPY.

Bayer would construct a second thermal oxidizer (S03) that would be utilized as an alternate control device for S01. The thermal oxidizer would be maintained in hot stand-by in order to allow the process vents routed to S01 to be quickly transferred to S03 in case of an unexpected shutdown of S01. S03 would be required to meet all emission limits and compliance restrictions as S01 when it is being utilized as the primary control device. The thermal oxidizer would also be constructed with Selective Non-Catalytic Reduction (SNCR) to reduce NOx emissions from the oxidizer. S03 would not include a Heat Recovery Steam Generator (HRSG) as it would only be operated during periods when S01 was down. The associated scrubber (S03) would be utilized to control acid gas (HCl) produced in the thermal oxidizer to less than 20 ppm.

A Bleach Scrubber (S04) would be used primarily as an odor control device to control VOCs from the mixing of the two catalysts utilized to produce one of the intermediates for the process. The VOC emissions would be limited to less than 20 ppm.

The facility has proposed to install two 65,000 gallon HCl storage tanks that would be routed to HCl scrubber (S05). This scrubber would be utilized to reduce HCl emissions to less than 20 ppm.

Dust from the unloading of off-spec Ammonimum Chloride (PM/PM10/PM2.5) would be controlled by a water scrubber (S06). The uncontrolled emissions from this source would be extremely small.

Dust from the packaging of Ammonimum Chloride would be controlled through a bag filter (S07). Ammonimum Chloride produces very little dust and therefore the emissions from this source would be extremely small as well.

Six final product (GA50) storage tanks, two quality control (GA50) storage tanks, and (GA50) loading operations would be routed to a water scrubber (S08) for control. The VOC emissions from the scrubber would be limited to less than 20 ppm.

Wastewater generated at Bayer would be required to be pretreated prior to being sent to either Evonik's wastewater treatment facility or to the Mobile Area Water & Sewer System. The vents from the pretreatment operations would be sent to the thermal oxidizer S01 for control.

Bayer would install two emergency diesel generators as part of this facility. The rating of the generators would not exceed 3400 HP each. The generators would be limited to less than 100 hr/yr for both PSD and NSPS/MACT requirements. The generators would be subject to 40 CFR Part 60, Subpart IIII and 40 CFR Part 63, Subpart ZZZZ.

Although Bayer would be considered a synthetic minor source with respect to HAPs, the facility has committed to complying with the requirements of 40 CFR Part 63, Subpart MMM (Pesitcide MACT). Subpart MMM would require the thermal oxidizers to meet a minimum DRE of 98%. Bayer would also be required to control HCl emissions to less than 20 ppm.

In order to insure the potential emissions from the facility are less than major source and significance thresholds, Bayer has also committed to installing an LDAR program that would meet the requirements of 40 CFR Part 63, Subpart H (HON LDAR) for all components in VOC/HAP service. The implementation of the LDAR program would result in a control efficiency of 87% for fugitive VOC emissions compared to average SOCMI Emission Factors.

Emissions

The emissions from the proposed facility, associated tanks, and loading and unloading operations would consist of VOCs (HAP & Non-HAP), and Particulate Matter (PM/PM10/PM2.5), NOx, CO, SO2, and GHGs. Lead emissions would be trivial. The controlled emission rates from all emission sources at Bayer are included in the two tables below.

Combustion Sources

Pollutant	S01	S02	**S03	***Gen #1	***Gen #2
PM/PM10 (lb/hr)	0.23	Trivial	Trivial		
PM/PM10 (TPY)	1.01	0.01	0.01	0.06	0.06
PM2.5 (lb/hr)	0.23	Trivial	Trivial		
PM2.5 (TPY)	1.01	0.01	0.01	0.06	0.06
*VOC (lb/hr)	0.46	Trivial	Trivial		
*VOC (TPY)	2.01	0.01	0.01	0.45	0.45
NOx (lb/hr)	3.44	0.02	0.04		
NOx (TPY)	15.11	0.08	0.17	0.90	0.90
CO (lb/hr)	1.15	0.02	0.03		
CO (TPY)	5.04	0.07	0.14	1.07	1.07
SO2 (lb/hr)	0.18	Trivial	Trivial		

SO2 (TPY)	0.79	Trivial	Trivial	Trivial	Trivial
GHGs (lb/hr)	2,803				
GHGs (TPY)	12,277	99.04	198.07	76.71	76.71
HAP – HCl (lb/hr)	0.62				
HAP – HCl (TPY)	2.70				
Total HAP (lb/hr)	1.94	0.01	Trivial		
Total HAP (TPY)	8.50	0.04	Trivial		

*VOC estimates include HAP - VOC emissions
**Emissions from S03 are from natural gas usage to maintain the unit in hot stand-by.
***Based on 100 hr/yr of operation

Non Combustion Sources

Pollutant	S04	S05	S06	S07	S08	FUG
PM/PM10 (lb/hr)			0.05	0.05		
PM/PM10 (TPY)			0.22	0.22		
PM2.5 (lb/hr)						
PM2.5 (TPY)						
*VOC (lb/hr)	0.16				0.16	3.64
*VOC (TPY)	0.71				0.71	15.96
HAP – HCl (lb/hr)		0.01				0.40
HAP – HCl (TPY)		0.04				1.75

The total controlled emission rates in TPY from the facility by pollutant are listed in the table below. Potential minor discrepancies from this analysis to the application are due to rounding differences.

	*PM (TPY)	SO2 (TPY)	NO2 (TPY)	VOC (TPY)	CO (TPY)	CO2e (TPY)
S01	1.01	0.79	15.11	2.01	5.04	12,277
S02	0.01		0.08	0.01	0.07	99.04
S03	0.01		0.17	0.01	0.14	198.07
S04				0.71		
S05						
S06	0.22					
S07	0.22					
S08				0.71		
Gen #1	0.06		1.96	0.45	1.07	76.71
Gen #2	0.06		1.96	0.45	1.07	76.71
FUG				15.96		
Total	1.59	0.79	19.28	20.31	7.39	12,728

*In order to be conservative, it is assumed that all PM emitted from the facility would be smaller than PM10 & PM2.5. A more refined breakdown of PM emissions was submitted in the application but would be unnecessary since the allowable PM emissions would be less than 10 TPY.

PSD

Bayer would be listed as a chemical process plant under ADEM Rules and Regulations. Therefore, in order for the facility by itself to be considered a major source with respect to PSD, the potential emissions of criteria pollutants (with the exception of GHG's) from this facility would be required to be greater than 100 TPY. The potential emissions of GHG's would be required to be greater than 100,000 TPY. The definition of a major stationary source may be found under 335-3-14-.04 of the ADEM Code of Regulations. Since there would be no pollutant's that would be potentially emitted in amounts greater than the major source threshold, this facility by itself would be considered a minor source with respect to PSD.

Relatedness

Bayer would be leasing land from Evonik that is currently adjacent to the Evonik facility. Bayer would also be utilizing raw materials and steam that would be purchased from Evonik. In order to address any concerns about the relatedness of the two facilities, Bayer has stated that the facility would be solely owned by Bayer and Evonik has no controlling interest in the facility. Bayer would employ its own plant personnel and would utilize its own entrance to the facility. Despite the fact that the two facilities would not be related, Bayer has committed to meeting the requirements of 40 CFR Part 63, Subpart MMM including the utilization of a Subpart H LDAR program in order to render the argument moot.

Additionally the table below shows that if the facility was considered a major source with respect to PSD due to its relationship with Evonik, Bayer would still not exceed the major source thresholds for a new facility or the significance thresholds for a major modification to an existing source.

Proposed Emissions	**New Source Thresholds**	**Major Modification Thresholds**
PM_{10} – 1.59 TPY	PM_{10} – 100 TPY	PM_{10} – 15 TPY
$PM_{2.5}$ - 1.15 TPY	$PM_{2.5}$ – 100 TPY	$PM_{2.5}$ – 10 TPY
VOC – 20.29 TPY	VOC – 100 TPY	VOC – 40 TPY
CO – 7.39 TPY	CO – 100 TPY	CO – 100 TPY
NOx – 19.27 TPY	NOx – 100 TPY	NOx – 40 TPY
SO2 – 0.79 TPY	SO2 – 100 TPY	SO2 – 40 TPY
GHGs – 12,575 TPY	GHGs – 100,000 TPY	GHGs – 75,000 TPY

Title V

In order to be considered a major source with respect to Title V, a facility must have the potential to emit either greater than 100 TPY of any criteria pollutant (except GHGs which has a threshold of 100,000 TPY), greater than 10 TPY of any one hazardous air pollutant (HAP), or a total of 25 TPY of total HAPs. The proposed Bayer facility would not exceed any of these thresholds. However, Bayer would be subject to the Area Source MACT referenced in 40 CFR Part 63, Subpart VVVVVV - National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources. This MACT specifically states "Any area source that installed a federally-enforceable control device on an affected CMPU is required to obtain a permit under 40 CFR part 70 or 40 CFR part 71 if the control device on the affected CMPU is necessary to maintain the source's emissions at area source levels." Based on this requirement Bayer would be required to submit an application for a Title V Permit within 1 year of start-up of the facility.

NSPS

Several New Source Performance Standards were reviewed for possible applicability to this facility. These are summarized below.

NNN/RRR

The GA50 production process would utilize several reactor systems and distillation columns to produce integral intermediates as well as the final products GA50 and Ammonium Chloride. A review of 40 CFR Part 60, Subparts NNN and RRR was performed and it was determined that no product listed in these subparts, with the exception of butene, would be generated as part of the GA 50 production process. While butene would be generated, the chemical would not be sold and would have to be shipped off-site for disposal. Therefore it would not be considered a product, by-product, or co-product of the process. Therefore, Bayer would not be subject to RRR or NNN.

VVa

Neither GA50 nor any of the intermediates produced to make GA50 are chemicals listed under 40 CFR Part 60, Subpart VVa. Therefore, BAYER would not be subject to this regulation and would not be required to implement a Subpart VVa program for this facility.

Kb

There would be 42 VOC containing storage tanks constructed as a part of this project. Twenty-one of these vessels would not meet the minimum size capacity (19,810 gallons) to be potentially subject to 40 CFR Part 60, Subpart Kb. Eight proposed storage tanks would have a capacity greater than 19,810 gallons but less than 39,890 gallons. All these vessels would store a material with a vapor pressure less than 2.18 psia and, therefore, would not be subject to Subpart Kb. Two vessels in this size category would store

Liquified Natural Gas (LNG) and would be under pressure and, therefore, exempt from Kb. The remaining eleven vessels are vessels that are greater than 39,890 gallons but store a VOC with a vapor pressure less than 0.51 psia. Therefore, these tanks would also not be subject to 40 CFR Part 60, Subpart Kb.

Dc

Bayer would operate a heat recovery steam generator (HRSGs) at the facility. The heat recovery steam generator utilizes waste heat from the thermal oxidizer to produce steam. No combustion takes place in the HRSG. Therefore, the HRSG would not be subject to 40 CFR Part 60, Subpart Dc. This interpretation is supported by EPA's applicability determination index control number 0000005 which states that combustion must take place in the unit to be considered a steam generating unit under this Subpart.

CCCC

The Department reviewed 40 CFR Part 60, Subpart CCCC – Standards of Performance for Commercial and Industrial Solid Waste Incineration. Since the facility would only burn vent gas and natural gas streams in the unit's thermal oxidizer's the material would not be classified as a solid waste. Therefore, Subpart CCCC would not apply to this facility.

IIII

The proposed emergency generators would be subject to 40 CFR Part 60, Subpart IIII. Bayer would be required to provide a certificate of conformity documenting that the proposed generators are certified and capable of meeting the emission standards for VOC, NOx, CO, and PM for this equipment once a model and vendor have been selected.

NESHAPs

No regulations listed in 40 CFR Part 61 were determined to apply to this facility.

Since Bayer would be considered an area source (less than 10 TPY of any single HAP and less than 25 TPY of total HAPs), only the area source MACTs were reviewed for potential applicability.

JJJJJJ

Bayer would operate a heat recovery steam generator (HRSGs) at the facility. The heat recovery steam generator utilizes waste heat from the thermal oxidizer to produce steam. No combustion takes place in the HRSG and therefore it would not be defined as a boiler under Subpart JJJJJJ. Therefore, the HRSG would not be subject to 40 CFR Part 60, Subpart JJJJJJ.

VVVVVV

40 CFR Part 63, Subpart VVVVVV - National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources was reviewed for possible applicability to this facility. Bayer processes would produce, as a by-product, chloroform, ethylene dichloride, and methylene chloride in quantities greater than 0.1% by weight. Therefore this regulation would apply to this process. Bayer has committed to complying with 40 CFR Part 63, Subpart MMM. By complying with Subpart MMM, all requirements required under Subpart VVVVVV would be met.

MMM/NNNNN

In order to insure that the potential emissions from this facility would be below significance levels for HAPs and VOCs, Bayer has committed to meeting a program equivalent to 40 CFR Part 63, Subpart MMM – Pesticide Active Ingredient Production NESHAP. This regulation would be applied to all process vents, loading racks, storage vessels, wastewater streams, and fugitive components in HAP/VOC service. The LDAR program associated with Subpart MMM would require the facility to comply with 40 CFR Part 63, Subpart H. Since the proposed process would also produce HCl, Bayer has committed to implementing a program equivalent to Subpart NNNNN – Hydrochloric Acid Production. Subpart NNNNN states that "An HCl production facility is not subject to this subpart if it is also subject to a NESHAP listed under one of the subparts listed in paragraphs (b)(1) through (5) of this section." Citation (b)(3) specifically references Subpart MMM. Therefore the facility would comply with both regulations by complying with Subpart MMM.

ZZZZ

The proposed generators would be subject to 40 CFR Part 63, Subpart ZZZZ. 40 CFR 63.6590(c) states that new emergency generators at an area source must meet the requirements of ZZZZ by meeting the requirements of 40 CFR Part 60 Subpart IIII. Since Bayer would be considered an area source for HAPs, the facility would comply with Subpart ZZZZ by complying with 40 CFR Part 60, Subpart IIII.

Since the proposed generators have been defined as emergency use only, it would be required to operate less than 100 hours per year for maintenance checks and testing. The proposed generator would also be required to keep records of hours of operation and a log book explaining each use of the generator. Bayer has also chosen to limit the usage of the generator to less than 100 hours per year for PSD applicability.

State Regulations

Ammonium Chloride would produced and then dried and packaged with the vents being controlled by a wet scrubber (S06) and a bag filter (S07). The process weight rate of the raw material would be 1.27 TPH. Based on the process weight curve found in ADEM Admin. Code 335-3-4-.04, the allowable emission rate for emission points S06 and S07 would be a total of 4.17 lb/hr.

Bayer has applied to be considered a synthetic minor source for both PSD and Title V. Therefore, allowable emission limits would be placed on each emission point listed above that is below the maximum particulate emissions allowed under the process weight curve.

Two storage tanks (25,000 Gallon Methanol Tank & 8,000 Gallon Carbon Tetrachloride Tank) would be subject to ADEM Administrative Code 335-3-6-.03 since the vapor pressure of the material stored in these tanks would be greater than 1.5 psia. The remaining proposed tanks would store a material with a vapor pressure less than 1.5 psia.

Coastal Consistency / Class I

The proposed Bayer facility would be constructed on property that is above the 10-foot contour line. Bayer has reported that the proposed facility has a base elevation of 27.15 feet. This elevation is consistent with Evonik and INEOS Phenol which are both located in the Theodore Industrial Park. Therefore, the Coastal Branch of ADEM was not contacted concerning this project. Bayer would be located approximately 93 km from the nearest Class I area (Breton). Since the emissions from this facility are below levels considered significant for PSD, there should not be any significant impact on this Class I area.

Air Toxics Review

An air toxics review was performed to insure that air toxics would not be emitted in quantities that would exceed levels allowed by the Department's Air Toxics Program. A copy of the review is included at the end of this determination.

Odors

Bayer has submitted an odor minimization plan for the facility. Odors would be minimized by insuring storage tanks and process vessels have closed tops and vent to control devices. The loading of tank trucks would be required to utilize vapor balance. Odors from component leaks would be minimized by the use of a Subpart H LDAR program. Sludges or solid residuals would also be stored in covered containers. Bayer has acknowledged that steps must be in place to minimize odors if they are detected off of plant property.

112(r)

Bayer submitted information concerning the applicability of the requirements found in 112(r) – Chemical Accident and Prevention Provisions to its proposed facility. Bayer has proposed to store and use three chemicals (ammonia, methane, and phosphorus trichloride) listed in these regulations. Bayer would store all these chemicals in sufficient quantities that the facility would be required to prepare a risk management program for these compounds. Bayer would also be subject to the General Duty Clause of 112(r) and

would design the facility to meet all EPA and OSHA standards. The 112(r) program is currently under the authority of the EPA and not the State of Alabama.

Recommendation

Since it appears that the main production facility, all associated tanks, truck loading and packaging areas would be capable of meeting all applicable State and Federal regulations, I recommend that permits with the attached provisos be issued to Bayer, pending the results of a public notice. The description of the permitted units and corresponding permit numbers are included below.

503-0137-X001 – GA50 and Ammonium Chloride Production Facility with Thermal Oxidizer, Heat Recovery Steam Generator, and HCl Scrubber (S01) in Series, Process Flare (S02), Back-up Thermal Oxidizer and HCl Scrubber (S03) in Series, Bleach Scrubber (S04), HCl Scrubber (S05), Two Water Scrubbers (S06 & S08), and Bag Filter (S07) for Control.

503-0137-X002 – Two - 3400 HP (2500 kWm) Emergency Compression Ignition Diesel-Fired Reciprocating Internal Combustion Engines

503-0137-X003 – 25,000 Gallon Submerged Fill Methanol Storage Tank (BA-100) & 8,000 Gallon Submerged Fill Carbon Tetrachloride Storage Tank (BA-150) Routed to Thermal Oxidizer (S01) for control

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Will Bacon
Chemical Branch
Air Division

January 21, 2014
Date

WAB:wab